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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/553,095

10/13/2005

Tomoko Aoki

2003JP308

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07/09/2008

AZ ELECTRONIC MATERIALS USA CORP.
ATTENTION: INDUSTRIAL PROPERTY DEPT.
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EXAMINER

LEUNG, WAYNE K

ART UNIT

PAPER NUMBER

4171

MAIL DATE

DELIVERY MODE

07/09/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/553,095 | Applicant(s) AOKI ET AL. | |
| | Examiner Wayne K. Leung | Art Unit 4171 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/10/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claims 3-12 are objected to because of the following informalities: The phrase "characterized in that" should read "wherein."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5 - 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The structure of Formula (1) is unclear to the examiner. As the formula is written, the valencies of either the silicon or the nitrogen atoms are not filled. As the specification also does not disclose further information on this matter, there is insufficient information to search the limitation recited in the instant claim.

4. Claim 6 recites the limitation "formula (1)" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1796

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Sunao (JP 07-292321A).

Regarding claim 1, Sunao teaches a solution of polysilazane and acrylic resin, wherein the substituents may be hydrogen, an alkyl, an alkenyl, a cycloalkyl, or an aryl group [0009], which corresponds to the polyalkylsilazane and the organic resin consisting of acrylic esters. Sunao further teaches that the acrylic or methacrylic acid may be used as an alcohol residue, or may contain or a carboxyl group or its salts [0027], corresponding to the side group limitation of claim 1.

Regarding claim 2, Sunao uses in example 1 Mitsubishi Rayon acrylic resin BR-71 which has an average molecular weight of 70,000 (Pg. 57 of *Industrial Synthetic Resins Handbook*).

Regarding claim 3, Sunao teaches that the acrylic resin is used in 30-97% of the total weight of polysilazane and acrylic resin [0028].

Regarding claim 4, Sunao teaches that the acrylic acid and the methacrylic acid derivatives are contained in more than 50%, which leaves less than 50% of the composition as free acid or alcohol [0027].

Claim Rejections - 35 USC § 103

7. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sunao (JP 07-292321A) as applied to claims 1-4 above, and further in view of Aoki et al. (JP 2002-075982 A).

The disclosure of Sunao is adequately set forth in paragraph 6 and is incorporated herein by reference. Regarding claim 9, Sunao is silent on the specific permittivity. However, Aoki et al. teaches that a specific dielectric constant of 2.5 or less is desirable to withstand the latest integrating processes [0003, 0006, 0007], and that a specific dielectric constant of less than 2.5 may be obtained by baking a coating of a composition comprising a polyalkylsilazane and a polyacrylic or polymethacrylic ester [0012]. As permittivity and dielectric constant is the same property, it would be obvious to one of ordinary skill in the art to bake the polyalkylsilazane coating as taught by Sunao in the manner taught by Aoki et al., and would have been motivated to do so to obtain the physical properties claimed by Aoki et al., including the specific permittivity.

Regarding claims 10 and 11, the process of preparing the polyalkylsilazane coating by preliminary heating in 50-300°C, allowing the film to stand in moistened atmosphere, then baking preferably at 300-500°C is fully disclosed by Aoki et al. [0027].

Regarding claim 12, although Sunao does not disclose that the invention may be used in semiconductors, Aoki et al. teaches that the treatment of the polyalkylsilazane in the process disclosed by Aoki et al. would yield materials that are suitable for use in semiconductors, and thus it would have been obvious to one of ordinary skill in the art to employ the film as the interlayer insulation film [0002].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wayne K. Leung whose telephone number is (571)270-5460. The examiner can normally be reached on M-Th 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ling-Siu Choi/
Primary Examiner, Art Unit 1796

Wayne K Leung
Examiner
Art Unit 4171

wkl